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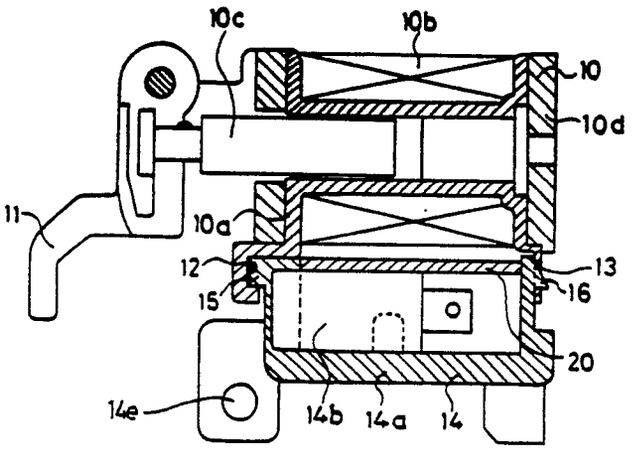
(54) Tripping device with burning prevention switch.

(57) A tripping device with burning prevention switch has a electromagnet (10) and a burning prevention switch (14) both of which are cased in each insulating bodies: The electromagnet (10) and the burning prevention switch (14) are combined by projections (15, 16) provided on the burning prevention switch (14) and hollow (12) and hole (13,) which are engaged with the projections (15, 16) provided on the electromagnet (10.)

FIG.4



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Tripping device with burning prevention switch

FIELD OF THE INVENTION AND RELATED ART STATEMENT

1. FIELD OF THE INVENTION

The present invention relates to a tripping device with burning prevention switch, and more particularly to miniaturize its size without deterioration of insulation characteristic.

2. DESCRIPTION OF THE RELATED ART

A typical conventional tripping device with burning prevention switch used in a circuit breaker has a structure and operation as described with reference to FIG.1, which is a sectional side view of the conventional tripping device with burning prevention switch. The tripping device has an electromagnet 1 and a burning prevention switch 2. The electromagnet 1 consists of a bobbin 1a, a coil 1b, a plunger 1c and a case 1d of conductivity material. The burning prevention switch 2 consists of a switch 2a and a switch lever 2b. The burning prevention switch 2 is fixed on an installation bracket 3 which is fixed to the electromagnet 1.

A tripping operation of this device is described below. An impression of a voltage to the coil 1b moves the plunger 1c, and the moving of the plunger 1c trips the trip-bar (not shown). When tripping, a cross-bar (or a movable contact) pushes the switch lever 2b as shown by an arrow 4. The moving of the switch lever 2b opens the switch 2a and cuts off a current to the coil 1b. Burning of the coil 1b is prevented, because the current of the coil 1b is cut off after the tripping.

In such a conventional tripping device, the device cannot be installed in small circuit breaker, because the device is large owing to the construction of using a bracket solely for mounting the burning prevention switch 2.

SUMMARY OF THE INVENTION

It is a purpose of the present invention to provide a tripping device with burning prevention switch which is small-sized and has a superior insulating characteristic.

The tripping device with burning prevention switch in accordance with the present invention comprises:

an electromagnet part which is contained in an insulating casing and has a plunger and an electromagnet for driving the plunger,

a burning prevention switch part, which is contained in another insulation body and has a burning prevention switch for cutting off a current to the electromagnet after a tripping, and

fastening means for fastening the electromagnet part and the burning prevention switch part by engaging of at least one projection provided on either one part in at least one hollow provided on the other part.

While the novel features of the invention are set forth particularly in the appended claims, the invention, both as to organization and content, will be better understood and appreciated, along with other objects and features thereof, from the following detailed description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG.1 is the cross-sectional side view of the conventional tripping device with burning prevention switch.

FIG.2 is a side view of a tripping device with burning prevention switch embodying the present invention.

FIG.3 is a plane view of the tripping device with burning prevention switch embodying the present invention.

FIG.4 is a cross-sectional side view of the tripping device with burning prevention switch embodying the present invention.

FIG.5 is a decomposed view of the tripping device with burning prevention switch embodying the present invention.

FIG.6 is an exploded perspective view of the tripping device with burning prevention switch embodying the present invention.

FIG.7 is a fragmentary cut-away side view of a circuit breaker in which the tripping device with burning prevention switch embodying the present invention is installed.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The structure of a preferred embodiment of a tripping device with burning prevention switch embodying the present invention is described in detail with reference to FIGs.2 to 7.

FIG.7 shows a manner of installing the tripping device with burning prevention switch in a circuit breaker. As shown in FIG.7, a case 5 made of an

insulating material consists of a base part 5a and a cover 5b. A handle 6 is projected from the case 5. A movable contact 7, a cross-bar 8 for holding the movable contact 7, a trip bar 9, the tripping device 30 with burning prevention switch are provided in the case 5. The tripping device 30 has an electromagnet 10 and a burning prevention switch 14.

The electromagnet 10 comprises a bobbin 10a of insulating material, a coil 10b, a plunger 10c and a case 10d, as shown in FIG.4. A tripping lever 11 is moved by the plunger 10c. The bobbin 10a made of insulating material has a hollow 12 as a first hollow which is formed by a bent part of the bobbin 10a. Further, the bobbin 10a has a hole 13 as a second hollow which is formed on an end of the bobbin 10a.

The burning prevention switch 14 comprises an insulating case 14a, a switch 14b and an insulating paper 20. The insulating case 14a has a first projection 15 to be engaged to the hollow 12 of the bobbin 10a and has a second projection 16 to be engaged to the hole 13 of the bobbin 10a. The second projection 16 has beveled slope for easy insertion into the hole 13.

From a state where the electromagnet 10 is separated from the burning prevention switch 14 as shown in FIG.5, the first projection 15 is inserted into the hollow 12. Next, the second projection 16 is slid and tailed into the hole 13 as shown in FIG.4. Therefore, the device is easily assembled. Then, by inserting a shaft 14d for switch lever 14c through a hole 17a of an arm 17, a spring 40 and a hole 14e, as shown in FIG.6, the electromagnet 10 and the burning prevention switch 14 are strongly fixed with each other.

When tripping is necessary, a voltage is impressed to the coil 10b of the electromagnet 10. The impression of a voltage to the coil 10b moves the plunger 10c as shown by an arrow 21 in FIG.7 and the moving of the plunger 10c trips a trip-bar 9. When tripping, the cross-bar 8 pushes the switch lever 14c as shown by an arrow 22. The moving of the switch lever 14c opens the switch 14b and cut off a current to the coil 10b. Therefore, the burning of the coil 10b is prevented, because the current of the coil 10b is cut off after tripping.

As a modified embodiment, the projection may be provided on the electromagnet 10 and the hollow is provided on the burning prevention switch 14.

As has been described in detail for various embodiments, the tripping device with burning prevention switch in accordance with the present invention becomes small and has superior insulating characteristic, because the electromagnet 10 and the burning prevention switch 14 are provided within the insulating case and are combined by simple engaging of the projection and the hollow.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been changed in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

Claims

1. Tripping device with burning prevention switch comprising:
an electromagnet part which is contained in an insulating casing and has a plunger and an electromagnet for driving the plunger,
a burning prevention switch part, which is contained in another insulation body and has a burning prevention switch for cutting off a current to the electromagnet after a tripping, and
fastening means for fastening said electromagnet part and said burning prevention switch part by engaging of at least one projection provided on either one part in at least one hollow provided on the other part.

FIG.1 (Prior Art)

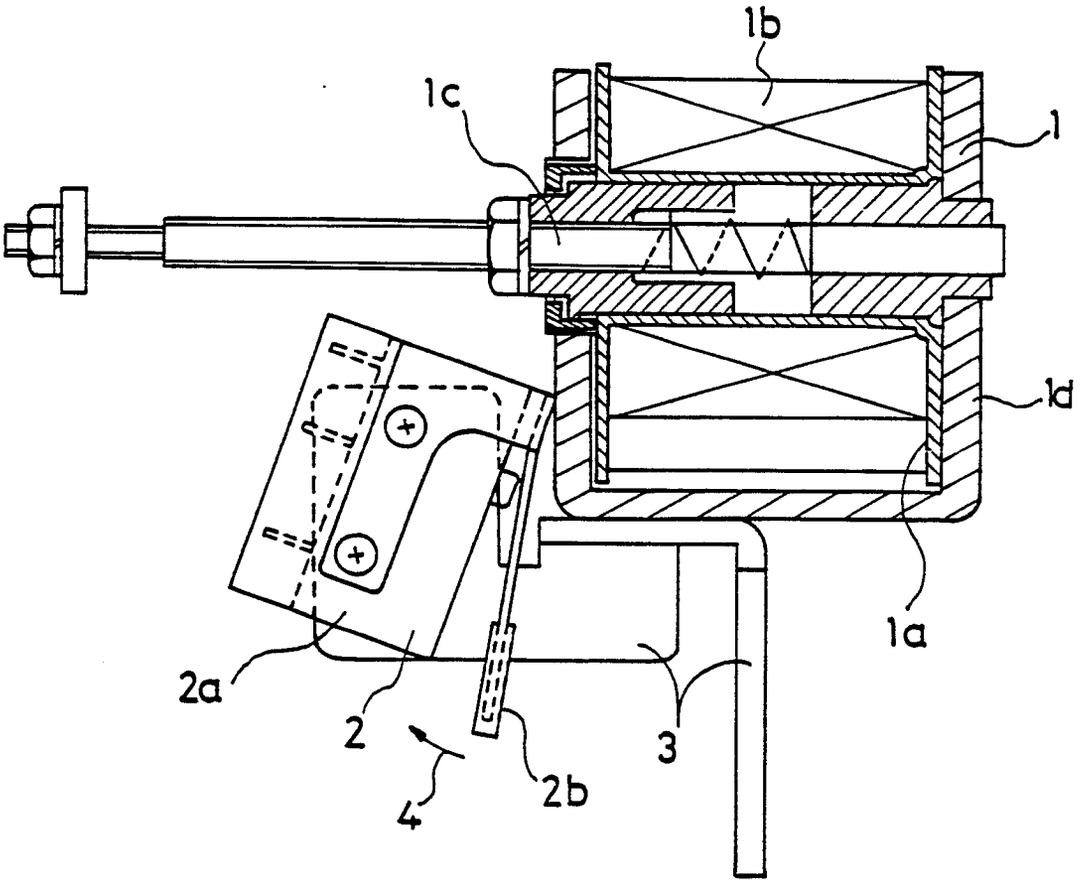


FIG.2

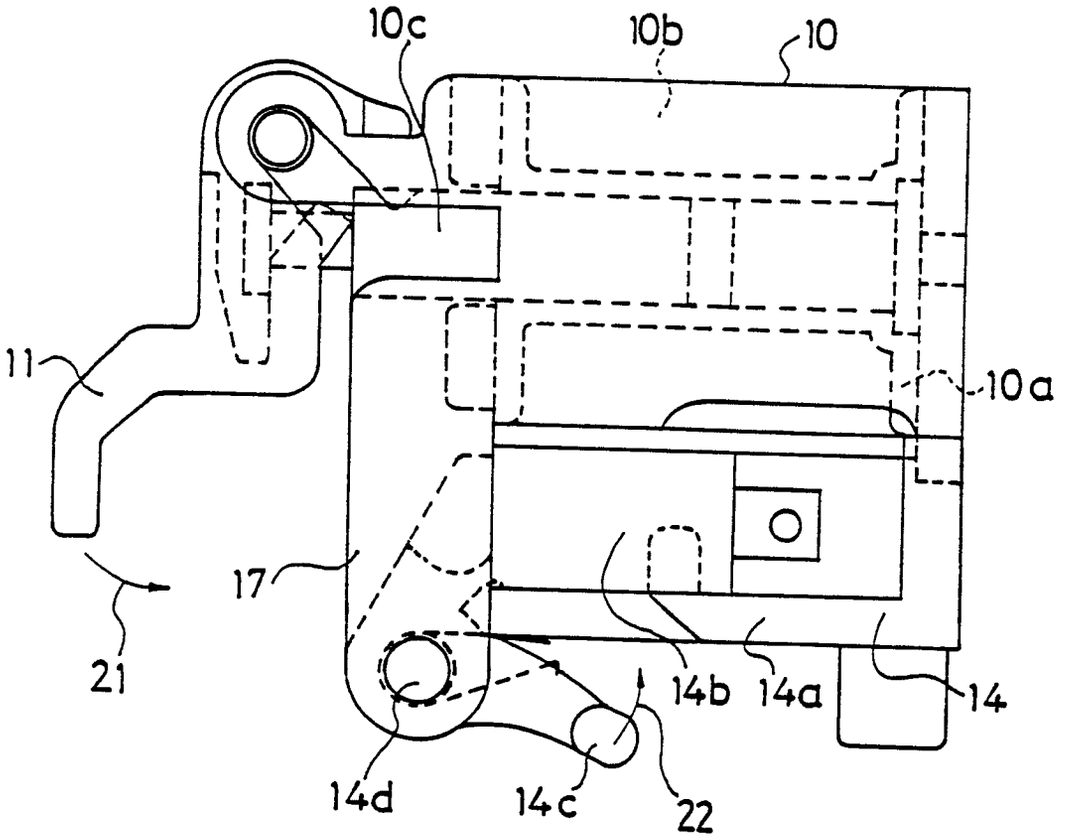

10c
10b
10
11
10a
17
21
14b
14a
14
14d
14c
22

FIG.3

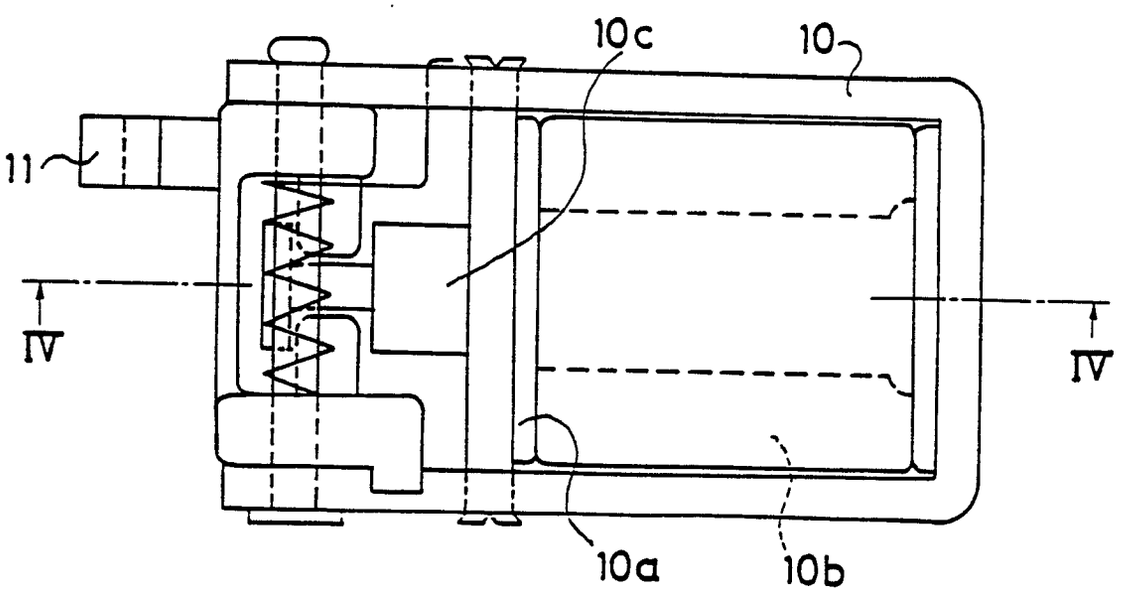

10c
10
11
IV
IV
10a
10b

FIG.4

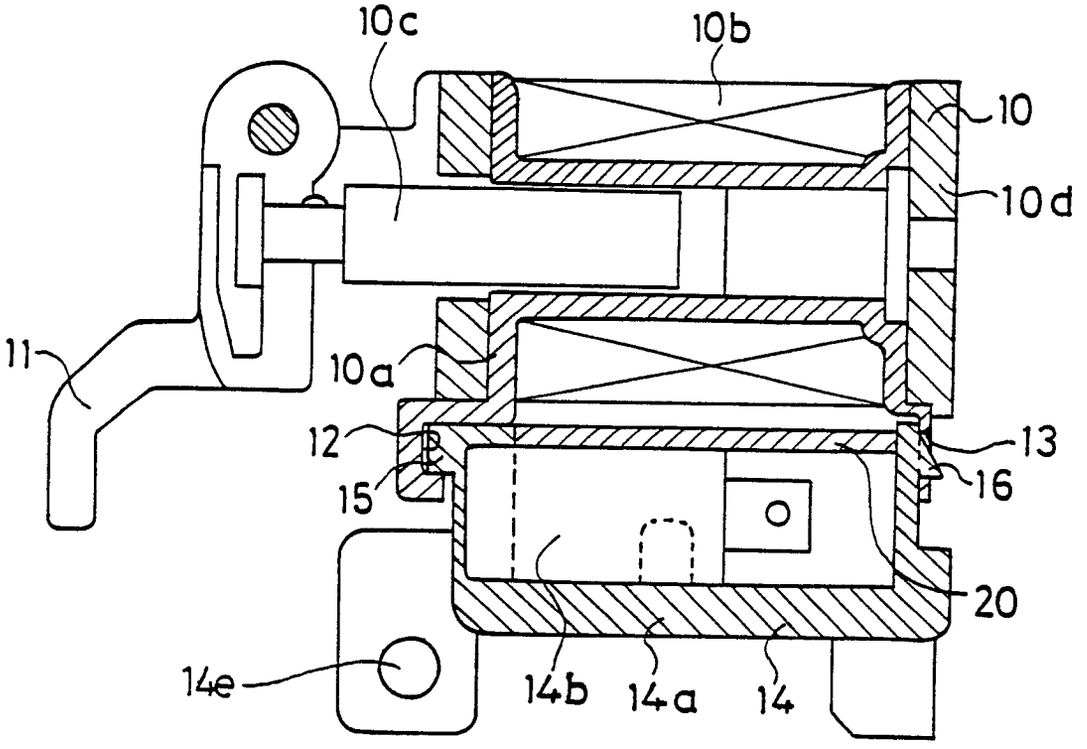

10c
10b
10
10d
11
10a
12
13
15
16
20
14e
14b
14a
14

FIG.5

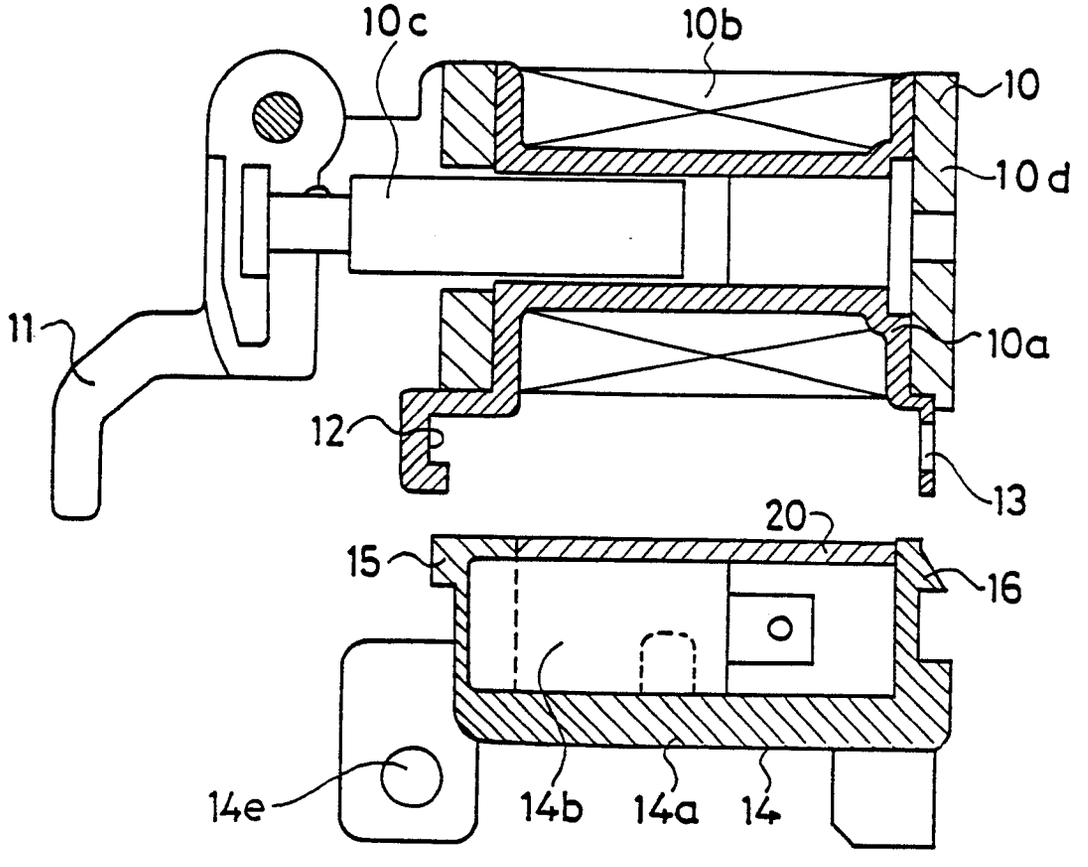
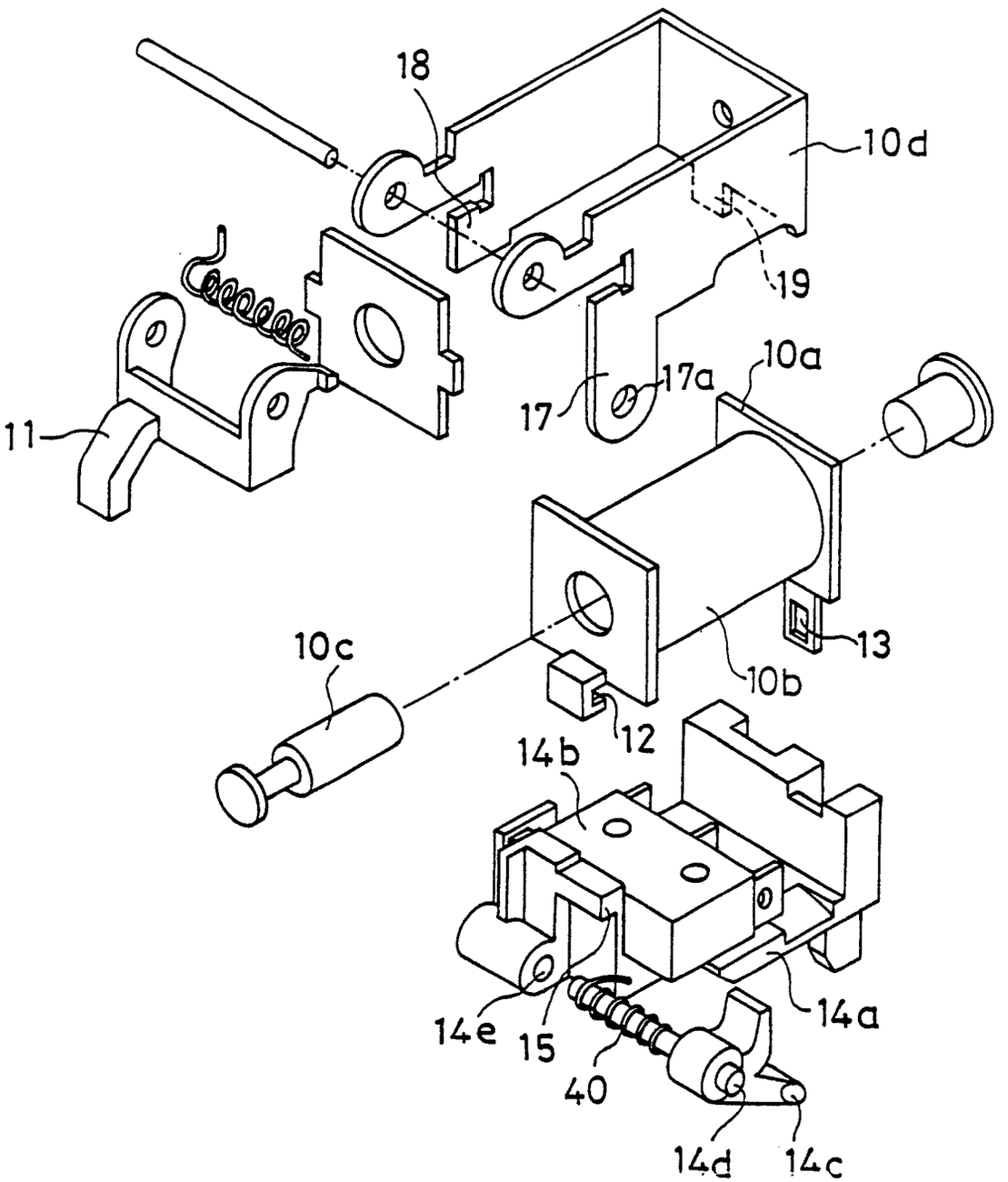

10c
10b
10
10d
11
10a
12
13
20
15
16
14e
14b
14a
14

FIG.6



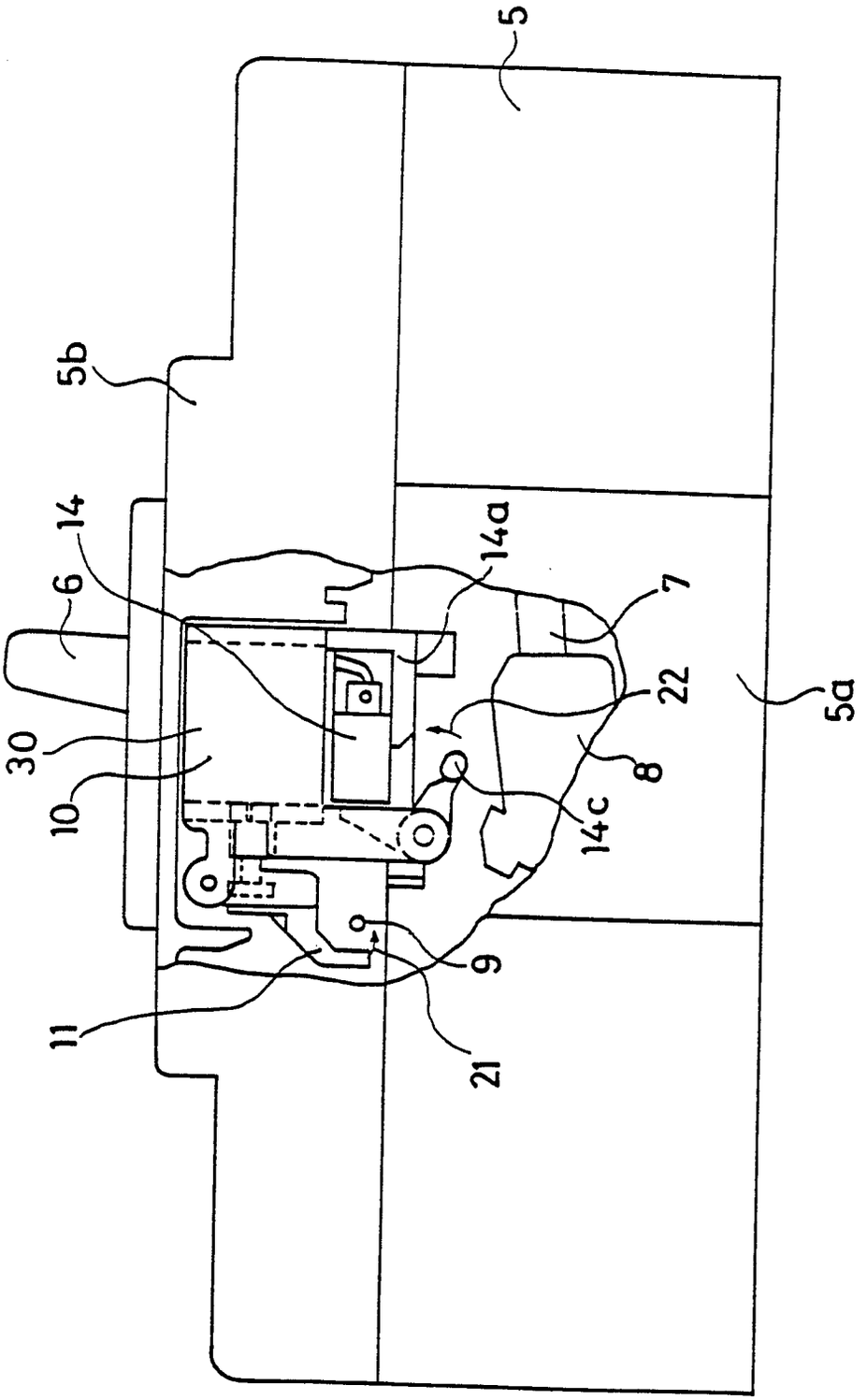


FIG. 7

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EUROPEAN SEARCH REPORT

Application number

EP 87 10 1179

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl 4)
A	DE-C- 227 944 (SIEMENS-SCHUCKERT WERKE GMBH) * page 1, lines 1-38 *	1	H 01 H 71/24 H 01 H 71/68
A	EP-A-0 133 333 (SACE S.P.A.) * claim 1 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

H 01 H 71/00
H 01 H 50/00
H 01 F 7/08

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	18-09-1987	RUPPERT W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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